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## Editorial

# An Introduction to the Special Issue “Ecological Sites for Landscape Management”



The December 2010 *Rangelands* “Ecological Site Descriptions” was one of the most widely read issues ever published. The individual papers have been used by scientists, managers, policymakers, and educators to convey the importance of ecological site information to natural resource management and to improve understanding of this tool. The issue was successful in providing a focal point for a widely dispersed literature and practice by bringing together historical perspective, terminology, general guidance, and applications to a variety of range and forest ecosystems. At the time of the previous special issue on ecological sites, the three predominant land management agencies in the United States (Bureau of Land Management, U.S. Forest Service, and Natural Resources Conservation Service) had just signed the Interagency Memorandum of Understanding; the Interagency Rangeland Ecological Site Manual was about to be released and individual agencies were realigning inventory and monitoring programs and staffs.

As an indication of how these ideas have extended into the natural resource profession beyond just rangeland management, authors in this special issue are involved in a wide variety of professional societies. In addition to SRM, authors are members of the Soil Science Society of America, the Wildlife Society, the Ecological Society of America, the International Association for the Study of the Commons, the International Association for the Study of Society and Natural Resources, the Wild Felid Association, the Society for Ecological Restoration, the American Society of Agricultural and Biological Engineers, and a host of state and local professional organizations.

The intervening 6 years have seen much progress and change in the science underlying ecological sites and in their applications to decision-making. Many of the concepts presented in the December 2010 *Rangelands* have been more widely applied and tested in the field. Among the most important of the findings was the need to separate inventory from interpretation. Ecological site inventory is a relatively objective collection of the physical setting (climate, geology, landscape position, soils) and the soil:vegetation dynamics of the site (state-and-transition models) that can be used to both define a site in a conceptual sense and to identify a specific point on the ground. More subjectively, but just as important, the interpretations take into account how those biotic and abiotic properties and relationships affect land managers’ decisions about what to manage for and how to achieve those goals, including social and economic contexts. One of the things that has plagued early attempts at converting existing information from range sites (ecological site precursors on rangeland) has been unstated assumptions about what the goal of land management should be.

Second, the integration of multiple ecological sites within the same landscape into behavioral units that affect both the need for management inputs and the output of ecosystem services has not been addressed very well. Rangeland managers have always known that successful management required at least a qualitative understanding of the components of the landscape. However, our desire to make ecological sites more quantitative has led to a greater focus on collecting data to separate them from their spatial context. The result has been an unsatisfying outcome in trying to

prove that ecological sites are standalone spatial units that can be quantitatively separated from other similar contiguous sites and a marked lack of progress in increasing a more landscape-scale oriented understanding of processes and ecosystem services.

We felt that, based on the accumulation of new information that has resulted from a global effort to test and refine ecological site concepts and applications, it was time for an update of our thinking about ecological sites. These refined ideas are expressed best via the creation of ecological site groups as a level in the conceptual hierarchy. In this issue, the four introductory papers describe a need for a more flexible and integrative approach to ecological sites. Karl and Talbot examine the reasoning behind existing ecological site concepts and propose a more logical approach to organizing existing information and identifying where new information can contribute to progress. Brown and Havstad look at the emerging opportunities for the quantification and marketing of ecosystem services from rangeland and rangeland dominated mixed landscapes that is contingent upon a systematic approach to integrating ecological process and outputs across multiple ecological sites. Salley et al. re-examine the land resource hierarchy that has been the basis for soil survey and site descriptions for the past half-century, and make a case for refocusing on the groupings of ecological sites/general soil maps as being a more accurate means of organizing information. Finally, Bestelmeyer et al. introduce a new database that integrates these concepts into a concrete, accessible and useable form.

The seven case studies that follow illustrate the use of a landscape-scale approach to using ecological sites to both identify critical components of the landscape to achieve ecosystem service goals: Spiegel et al. use a collection of ecological sites with knowledge of their interactions to identify critical habitat management objectives for a threatened species; Stringham et al. group existing sites together to identify priorities for post-fire management; and Williams et

al. apply a complex hydrology model to a collection of similar ecological sites to identify critical management requirements. Johanson et al. and Drohan and Ireland illustrate how ecological site groups can be applied to forest ecosystems where soil maps are available and a working knowledge of ecosystem dynamics is well established, but organization at the landscape scale is not systematically available. While not dealing explicitly with a single location, the case study by Bruegger et al. reports on a workshop approach that can be used to bring available information, current collaborators, and potential new partners together to work toward agreement on the validity of existing ecological sites and to identify priorities for improvements. Similarly, Duniway et al.'s case study is a work-in-progress report of the use of a workshop approach to bring together familiar collaborators to quickly and efficiently organize existing information into ecological site groups.

We think the combination of conceptual papers and case studies in this special issue will provide both a good measure of progress for the ideas contained in the 2010 special issue, as well as a reassessment and redirection based on the enhanced understanding that resulted from that collection of ideas. This special issue should also give us all pause to think of what should be in the next special issue on ecological sites.

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